

Amendments to the Drawings

The attached sheet of drawings includes changes to Fig. 13A. The change to Fig. 13A is to correct a typographical error in that the phrase "Empty Purge" should read - - Empty Charge - - as described in lines 18-21 on page 30 of the specification.

Attachment: Replacement Sheet

Annotated Sheet Showing Changes

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REMARKS/ARGUMENTS

Amendments to the Claims

Claims 1-21 remain pending in the application.

Claims 6, 15 and 22-24 have been withdrawn from consideration.

Reconsideration is requested of the withdrawal of claims 6 and 15.

Priority

Applicants appreciate the Examiners acknowledgement of the claim for priority and receipt of the priority document.

Request for Consideration of Claims 6 and 15

Claims 6 and 15 were withdrawn from consideration as allegedly being directed to a non-elected invention. Applicants wish to point out, however, that claim 6 is dependent from claim 1 and is similar to claim 11 which is being considered. The only difference is that claim 11 is dependent from claim 7. It is further noted that claim 15 has amended to depend from claim 7 and is similar to claim 5 which is being considered. The only difference is that claim 15 is dependent from claim 7 whereas claim 5 is dependent from claim 1.

It is therefore respectfully requested that the withdrawal of claims 6 and 15 be reconsidered and not be withdrawn.

Specification

The specification has been amended on pages 2, 13, 15 and 23 to correct inadvertent errors with respect to reference numerals and letters shown in the drawings. No new matter has been added by the amendments to the specification.

Amendments to the Drawings

Fig. 13A of the drawings has been amended to change the designation "Empty Purge" to - - Empty Charge - -. This change is in accordance with the description in the specification at page 30, lines 18-21. Both a replacement sheet 7/14 and an annotated sheet 7/14 are attached. It is respectfully requested that this amendment to the drawings be approved.

Rejection of the Claims

Claims 1, 3 and 16 stand rejected under 35 USC § 102(b) as anticipated by JP 10-104114. Claims 7, 14 and 19 stand rejected under 35 USC § 102(b) as being anticipated by JP 8-354452.

Claims 2, 5, 8, 9, 17, 18, 20 and 21 stand rejected under 35 USC § 103(a) as being unpatentable over JP 10-104114 in view of JP 2003-155959.

Request for Full English Translations of References Cited in PCT Search Report

Applicants do not have a full English translation of the three references relied upon by the Examiner in rejecting the claims, i.e. JP 10-104114, JP 8-35452 and JP 2003-155959.

Applicants, however, do have English abstracts of each of these three references. Copies of the three English abstracts of these references are attached.

Patentability of the Claims

Certain of the claims have been amended to more clearly define Applicant's invention.

As amended, claim 1 now defines an evaporation leak diagnostic device which includes pressure detection means (133) for detecting the pressure of an evaporation purge system, shut-out means (143, 151) for shutting out the evaporation purge system from atmospheric air, a pump (146) for pressurizing or depressurizing the evaporation purge system and leak judgment means comprising a control unit 115 which drives the pump while the shut-out means shuts out the evaporation purge system from atmospheric air, stops the pump when the pressure detected by pressure detection means reaches a predetermined level and formulates a leak judgment in accordance with the time the pump is driven and a pressure change encountered after pump stoppage. Claim 16 is similar but is a method claim.

Claim 7 defines an evaporation leak diagnostic device which includes the pressure detection means, the shut-out means, the pump, and leak judgment means comprising a control unit which drives the pump for a predetermined period of time while the shut-out means shuts out the evaporation purge system from atmospheric air and formulates a leak judgment in accordance with the amount of pressure change that the pressure detection means detects during the time the pump is driven and the amount of pressure change during a predetermined period of time after pump stoppage. Claim 19 is similar but is a method claim.

A significant feature of the present invention is to carry out a leak judgment in accordance with two parameters, namely, one from the period of time the pump is driven and the other from the period of time after pump stoppage.

With respect to independent claims 1 and 16, one of the two parameters is the time interval from the start of driving the pump after shutting out the evaporation purge system to the pump stoppage when the pressure detected by the pressure sensor reaches a predetermined level. The other parameter is the amount of pressure change during a predetermined time span after the pump stoppage.

With respect to independent claims 7 and 19, one of the two parameters is the amount of pressure change that the pressure sensor detects in the pump driving period. The other parameter is the amount of pressure change during a predetermined time span after the pump stoppage. The significant features mentioned above enable the present invention to provide an evaporation leak diagnostic device and method which excludes any influence from fuel level undulation (slosh) in motion.

As discussed hereafter, Applicants' invention, as now claimed, is patentable over the prior art, since the references relied upon by the Examiner, taken either alone or in combination, do not teach or suggest the significant features described above.

In rejecting claims 1, 3 and 6 as being anticipated by JP '114 and claim 7, 14 and 19 as being anticipated by JP '452, the Examiner has not given any explanation as to how these references meet the limitations of the rejected claims. Moreover, with respect to the rejection of claims 2, 5, 8, 9, 17, 18, 20 and 21 as being unpatentable over JP '114 in view of JP '959, the Examiner has only generalized the teachings of JP '114 and has not specifically identified which elements of the reference meet the limitations of the claims. It is therefore respectfully submitted that the Examiner has not met his burden of showing how the references either anticipate or render obvious the claims. In any event, Applicants submit that the references do not anticipate or render obvious the claims.

As noted above, Applicants do not have the full English translation of the three cited Japanese references relied upon by the Examiner. Applicants, however, provide the following explanation concerning the teachings of these references and submit that they do not anticipate or render obvious any of the claims of the present application.

JP 10-104114 discloses a leak diagnostic device provided with a leak detection means for an evaporated fuel processing passage based on the pressure detected by a pressure sensor for the pressure in the evaporated fuel processing passage shut out under high pressure. Claim 1 of the '114 reference is directed to this concept.

Claim 5 defines the leak diagnostic device as estimating an area of a leaking hole based on the attained pressure after having been pressurized by an air feeding pump and the time span for attaining such pressure. Claim 6 defines the leak diagnostic device as estimating an area of a leaking hole based on the attained pressure after having been pressurized by an air feeding pump, a time span for attaining such pressure, a time span for pressure decreasing from cutting off the air supply from an air pump by a valve to the pressure sampling time, and a pressure at the end of the time span for pressure decreasing, keeping the processing passage shut off.

JP 8-35452 discloses a diagnostic method for an evaporation purge system wherein the leak diagnosis starts by setting both the second control valve (block valve) 4 and the third control valve (gauge valve) 5 closed, as well as setting the first control valve (purge valve) 3 open. Then, the evaporation purge system is rapidly depressurized due to the negative pressure in intake pipe. The first control valve 3 is closed when pressure sensor 6 (differential pressure gauge) detects predetermined pressure differential ($\text{Pa} \cdot \text{Pt0}$) to the atmospheric pressure Pa . If any leak exists, the

pressure differential will gradually be lost depending on the size of leak. At a predetermined time (t_1-t_0), pressure differential (P_a-P_{t1}) and pressure change rate (dP_{t1}/dt) are measured. Then, the third control valve 5 is opened. The pressure increase (pressure differential decrease) is accelerated and after a predetermined time span, pressure differential (P_a-P_{t2}) and pressure change rate (dP_{t2}/dt) are measured. Then once again, the third control valve 5 is closed. At this stage, the pressure already has come close to the atmospheric pressure, so pressure increase is largely controlled by fuel evaporation rather than by leak. After a predetermined time span, pressure change rate (dP_{t3}/dt) is measured.

Based on the above-mentioned pressure differentials (P_a-P_{t1}) and (P_a-P_{t2}), as well as the pressure change rates (dP_{t1}/dt), (dP_{t2}/dt) and (dP_{t3}/dt , leak area A_1 is calculated by the formula (2) and if A_1 exceeds a predetermined value, the diagnostic method judges a malfunction and outputs a warning signal.

JP 2003-155959 discloses a malfunction diagnosis device for evaporation purge system and was cited as teaching that “a means of leaking judgment operated while the engine is stopped is old and well known in the art.” In ‘959, when a malfunction diagnosis is paused or after it is over, an evaporation purge system may keep its inside pressure higher than the atmospheric pressure. In such a case, when a canister closing valve is opened, fuel evaporation gas may be emitted into the atmosphere together with the air being blown out at high speed.

The invention disclosed in ‘959 is a malfunction diagnosis device for an evaporation purge system provided with a pressure relief control means for controlling the pressure in the evaporation purge system to be the atmospheric pressure by regulating the canister closing valve. The malfunction diagnosis device

for an evaporation purge system disclosed in this reference is for detecting a fuel leak based on the pressure in the shut-out evaporation purge system.

It is submitted that Applicants' invention as now claimed is patentable.
Reconsideration and allowance of the claims is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Mattingly, Stanger, Malur & Brundidge, P.C., Deposit Account No. 50-1417 (referencing attorney docket no. H&A-5128)

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

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FIG. 13 A

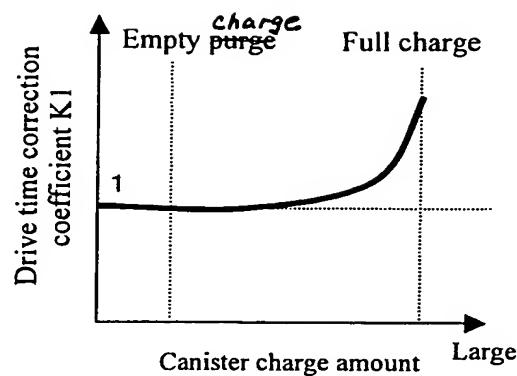


FIG. 13 B

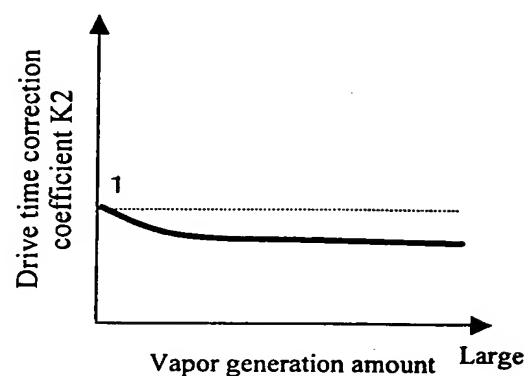
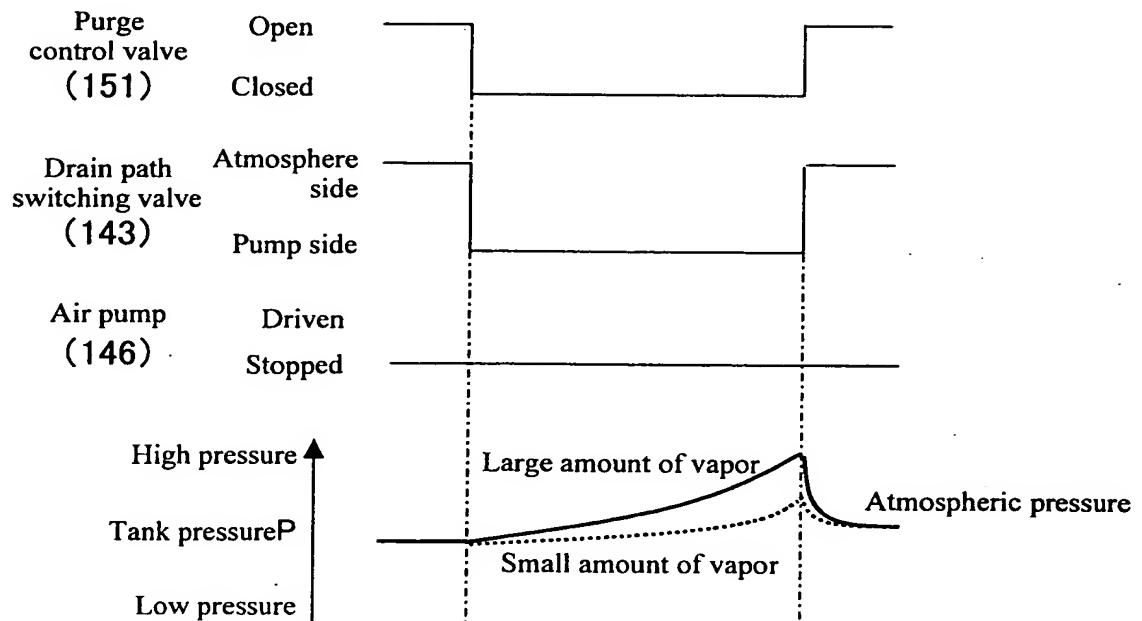


FIG. 14



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-104114
 (43)Date of publication of application : 24.04.1998

(51)Int.Cl. G01M 3/26
 F02B 77/08
 F02M 25/08
 F02M 37/00
 G01M 3/00

(21)Application number : 08-259725
 (22)Date of filing : 30.09.1996

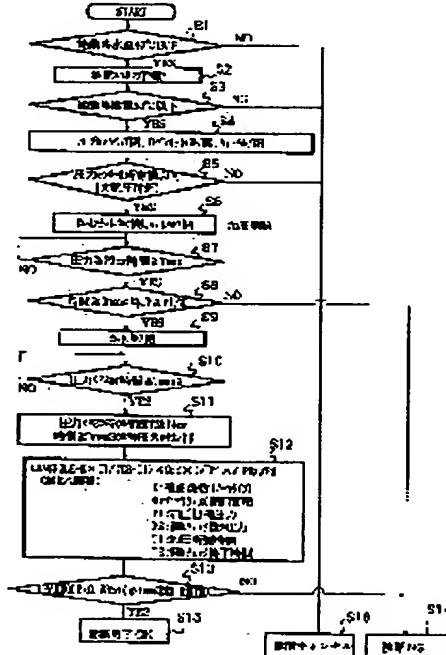
(71)Applicant : NISSAN MOTOR CO LTD
 (72)Inventor : KURIKI HIROSHI

(54) LEAKAGE DIAGNOSTIC APPARATUS IN PROCESSING APPARATUS FOR EVAPORATED FUEL OF ENGINE

(57)Abstract:

PROBLEM TO BE SOLVED: To accurately diagnose a leakage in an evaporated fuel-processing apparatus without inviting a large cost increase.

SOLUTION: The air from an air pump set so as to supply a secondary air to a discharge path is introduced into a closed process route of an evaporated fuel-processing apparatus at the operation start time at low temperatures for supplying the secondary air. The process route is consequently pressurized (S1-S6). The area of a leaking hole is estimated based on a pressure decrease characteristic after the pressuring is stopped (S10, S11) and a volume of the process route estimated based on the pressuring time and the reached pressure.



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[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

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PATENT ABSTRACTS OF JAPAN

(11) Publication number : 08-035452
 (43) Date of publication of application : 06.02.1996

(51) Int.Cl.

F02M 25/08

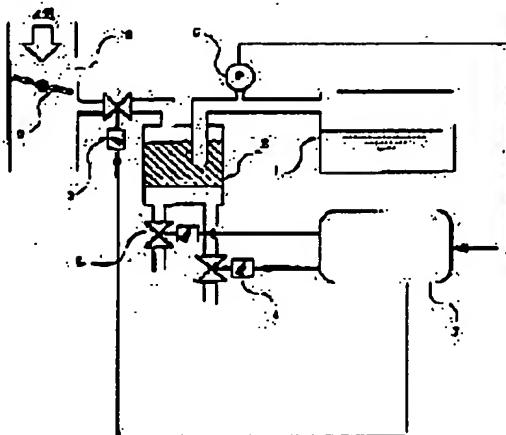
(21) Application number : 06-173837(71) Applicant : HITACHI LTD(22) Date of filing : 26.07.1994(72) Inventor : KURIHARA NOBUO
KIMURA HIROSHI
TAKAKU YUTAKA
ISHII TOSHIO

(54) DIAGNOSTIC METHOD FOR EVAPORATION PURGE SYSTEM

(57) Abstract:

PURPOSE: To provide a diagnostic method free from an effect due to a diagnostic environment condition including fuel evaporation and a fuel remnant in the fuel oil tank of an internal combustion engine and the atmospheric pressure at the time of detecting a leak at an evaporation purge system for preventing the discharge of fuel evaporated in the tank to the atmosphere.

CONSTITUTION: This system is formed out of the first control valve (purge valve) 4 for opening and closing a passage to an intake pipe 8, the second control valve (block valve) 4 for sealing an atmosphere release opening to a canister 2, the third control valve (gauge valve) 5 used as a reference for judgement about leakage, a pressure sensor 6 or a pressure switch for detecting a pressure variation in a system and a controller 7 for executing a logic for detecting leakage at a purge system on the operation of the sensor 6 or the switch and an actuator. Thus, an effect due to an external factor such as fuel temperature, a fuel remnant in a tank, and the atmospheric pressure can be eliminated by using the third control valve (gauge pressure) as a reference for judgement on leakage.



LEGAL STATUS

[Date of request for examination] 30.09.1997

[Date of sending the examiner's decision of rejection] 23.03.1999

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection] 11-006227

07-01-30;17:58 ;平木国際特許事務所

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[Date of requesting appeal against examiner's decision of rejection] 21.04.1999

[Date of extinction of right]

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-155959
 (43)Date of publication of application : 30.05.2003

(51)Int.CI. F02M 25/08
 G01M 15/00

(21)Application number : 2002-041442 (71)Applicant : DENSO CORP
 TOYOTA MOTOR CORP
 (22)Date of filing : 19.02.2002 (72)Inventor : NAGASAKI KENJI
 KANO MASAO
 ITOU TOKIJI
 MIYAHARA HIDEKI

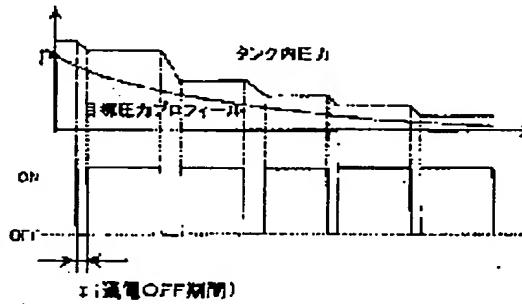
(30)Priority
 Priority number : 2001272673 Priority date : 07.09.2001 Priority country : JP

(54) ABNORMALITY DIAGNOSIS DEVICE FOR EVAPO-PURGE SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an abnormality diagnosis device for an evapo-purge system which prevents an evaporated gas of fuel adsorbed to a canister from being blown to an atmosphere at the time of release of the pressure of the evapo-purge system.

SOLUTION: When a canister closing valve is opened, a target pressure profile is set and an turn-off period learning value τ_i is set based on a deviation ΔP_{ac} of a pressure between the pressure P of the evapo-purge system and the target pressure P_p by the target pressure profile. Therefore, since, as shown in (b), an turn-off period τ corresponding to the deviation ΔP_{ac} of the pressure is set, the pressure P of the evapo-purge system follows the target pressure profile as shown in (a). Thereby, it can be prevented that the evaporated gas of the fuel adsorbed to the canister is released to the atmosphere.



LEGAL STATUS

[Date of request for examination] 16.09.2003
 [Date of sending the examiner's decision of rejection]
 [Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
 [Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision
of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

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